

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-309940
 (43)Date of publication of application : 26.11.1996

(51)Int.Cl.

B32B 27/36
 B05D 5/12
 B05D 7/00
 B05D 7/04
 B05D 7/24
 B32B 27/08
 B32B 27/18
 C08J 7/04

(21)Application number : 07-082577
 (22)Date of filing : 07.04.1995

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 KITAZAWA SATOSHI

(30)Priority

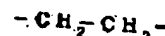
Priority number : 06314656 Priority date : 19.12.1994 Priority country : JP
 07 55772 15.03.1995 JP

(54) DESTATICIZED FILM

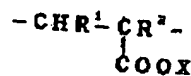
(57)Abstract:

PURPOSE: To obtain a destaticized film having excellent back surface transferability of antistatic agent and obtaining high destaticization even by a relatively thin destaticized coating film by using the agent represented by a specific chemical structure and to use the destaticized film for a magnetic card, a packaging material, a graphic material, an OHP film or a magnetic recording medium.

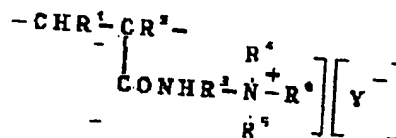
CONSTITUTION: An antistatic agent containing a copolymer of 10 to 99mol% of ethylene unit represented by a formula I, 0 to 80 mol% of acrylic acid unit represented by a formula II and 1 to 40mol% of a unit containing a cationic nitrogen group at a side chain and represented by a formula III as main ingredients is synthesized with the one surface of a polyester film. A destaticized film is provided with a destaticized coating film formed by coating with aqueous coating fluid containing the agent, drying it and orienting it. In the formula II, R1, R2 are H or CH3, X is H, 1-10C saturated hydrocarbon group or the part of the H indicates a hydroxyl group, and a saturated hydrocarbon group in which the part of the H is substituted for a hydroxyl group, an alkoxy group or a glycidyl group. In the formula III, R1, R2 are H or CH3, R3 is 2-10C saturated hydrocarbon, and Y is halogen ion.



I



II



III

LEGAL STATUS

[Date of request for examination]

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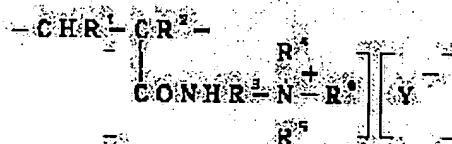
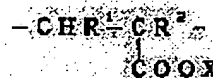
JP

(54) DESTATICIZED FILM

(57)Abstract:

PURPOSE: To obtain a destaticized film having excellent back surface transferability of antistatic agent and obtaining high destaticization even by a relatively thin destaticized coating film by using the agent represented by a specific chemical structure and to use the destaticized film for a magnetic card, a packaging material, a graphic material, an OHP film or a magnetic recording medium.

CONSTITUTION: An antistatic agent containing a copolymer of 10 to 99mol% of ethylene unit represented by a formula I, 0 to 80 mol% of acrylic acid unit represented by a formula II and 1 to 40mol% of a unit



containing a cationic nitrogen group at a side chain and represented by a formula III as main ingredients is synthesized with the one surface of a polyester film. A destaticized film is provided with a destaticized coating film formed by coating with aqueous coating fluid containing the agent, drying it and orienting it. In the formula II, R1, R2 are H or CH3, X is H, 1-10C saturated hydrocarbon group or the part of the H indicates a hydroxyl group, and a saturated hydrocarbon group in which the part of the H is substituted for a hydroxyl group, an alkoxy group or a glycidyl group. In the formula III, R1, R2 are H or CH3, R3 is 2-10C saturated hydrocarbon, and Y is halogen ion.

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[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the antielectricity characteristic film [excellent in antistatic nature, tooth-back imprint nature, *****-proof, blocking resistance, and recovery nature / useful into a magnetic card (for example, a telephone card, a prepaid card), an electronic ingredient, a graphic ingredient, a platemaking film, an OHP film, a magnetic-recording ingredient (for example, magnetic disks, such as magnetic tapes, such as an audio tape and a video tape, and a floppy disk), etc.] useful to especially magnetic cards in more detail about an antielectricity characteristic film.

[0002]

[Description of the Prior Art] The film which consists of polyester, such as polyethylene terephthalate and polyethylenenaphthalate, is widely used as the object for magnetic cards, and objects for magnetic-recording ingredients, such as objects for general industrial ingredients, such as wrapping, a photograph ingredient, and a graphic ingredient, and a magnetic tape. However, it has the fault of this polyester film having large surface specific resistance, and being easy to be charged in friction etc. If a film is charged, dust and dust will adhere to a film front face, and the trouble by these will arise. Moreover, discharge takes place at a processing process, and when the organic solvent is used, the risk of ignition arises.

[0003] As one of the approaches of preventing the trouble by such electrification, the approach of forming an antielectricity characteristic paint film in a film front face is proposed variously, and is put in practical use. Although the thing of a low-molecular mold and the thing of a macromolecule mold are known as an antistatic agent which this antielectricity characteristic paint film is made to contain, it has merits and demerits, respectively. Then, the antistatic agent is properly used according to the application in the property.

[0004] For example, the polymer (JP,3-255139,A, JP,4-288127,A, JP,6-172562,A) which has the nitrogen element which the anion system antistatic agent of surfactant molds, such as a long-chain alkyl compound (publication number No. 28728 [four to]) which has a sulfonate radical, is known as an antistatic agent of a low-molecular mold, and was ionized by the principal chain as an antistatic agent of a macromolecule mold, sulfonate denaturation polystyrene (JP,5-320390,A), etc. are known.

[0005] However, in the antielectricity characteristic paint film using the antistatic agent of a low-molecular mold, there are a problem by some antistatic agents moving in the inside of a paint film, it piling up an interface, and shifting to the opposite side of a film etc. and a problem that antistatic nature (antielectricity characteristic) gets worse with time. Since it is required that combination of a lot of [on the other hand / in order to acquire a good antielectricity characteristic in the antielectricity characteristic paint film using the antistatic agent of a macromolecule mold] antistatic agents makes an antielectricity characteristic paint film with thickness thick in being required form, it is not economical. Moreover, when the waste films (for example, film edge which carried out cutting removal from the product) used as a product are collected and it is used as a rework for film manufacture, there are problems, like the paint film component contained in a rework in the case of melting film production heat-deteriorates, and the obtained film becomes what colors remarkably and lacks in practicality (recovery nature is inferior).

Furthermore, there are a fault in which a film comrade cannot exfoliate easily (blocking), a fault which can be easy to delete a paint film, and the solution is desired.

[0006]

[Problem(s) to be Solved by the Invention] The purpose of this invention cancels the trouble of this conventional technique, and is to offer the antielectricity characteristic film excellent in antistatic nature, tooth-back imprint nature, recovery nature, *****-proof, and blocking resistance.

[0007]

[Means for Solving the Problem] According to this invention, the purpose of this invention at least on one side of polyester film the configuration (unit i) 10-99 mol shown by the following formula (I) -- % - The aqueosity coating liquid containing the antistatic agent (A) which uses as a principal component the configuration unit (iii) 1 shown by the configuration unit (ii) 0 shown by the following formula (II) - the 80-mol % and following formula (III) - 40-mol % of a copolymer (A-1) is applied. It is attained by the antielectricity characteristic film with which the antielectricity characteristic paint film extended [was dried and] and built is prepared.

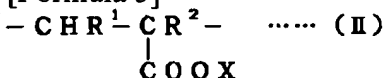
[0008]

[Formula 4]



[0009]

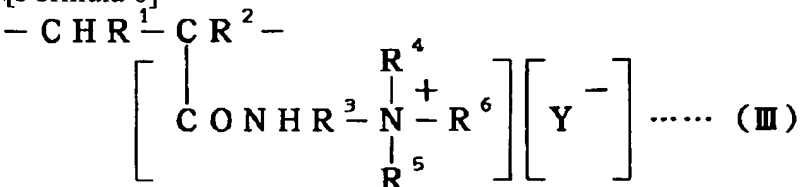
[Formula 5]



[0010] [-- the inside of a formula (II), R1, and R2 -- H or CH3 as for;X, the carbon number by which the saturated hydrocarbon radical of 1-10 or a part of H was permuted for H and a carbon number by the hydroxyl group, the alkoxy group, or the glycidyl group shows the saturated hydrocarbon radical of 1-10

[0011]

[Formula 6]



[0012] the inside of [type (III), R1, and R2 -- H or CH3;R3 -- a carbon number -- 2 - 10 alkylene-group; -- R4 -- R5 and R6 The saturated hydrocarbon radical of 1-15 or a part of H Hydroxyl group, [a carbon number] The carbon number permuted by the alkoxy group or the glycidyl group is saturated hydrocarbon radical;Y of 1-15. - Halogen ion,] which shows monochrome or the Pori alkyl halide ion, nitrate ion, sulfate ion, alkyl sulfate ion, sulfonate ion, or alkyl sulfonate ion

Hereafter, this invention is explained to a detail.

[0013] the line which the polyester which constitutes this film becomes from a dicarboxylic acid component and a glycol component although a base film is polyester film in [base film] this invention -- it is polyester.

[0014] As this dicarboxylic acid component, a terephthalic acid, isophthalic acid, 2, 6-naphthalene dicarboxylic acid, a hexahydro terephthalic acid, 4, 4'-diphenyl dicarboxylic acid, an adipic acid, a sebacic acid, dodecane dicarboxylic acid, etc. can be mentioned, for example, and terephthalic-acid, 2, and 6-naphthalene dicarboxylic acid is especially desirable.

[0015] Moreover, as a glycol component, ethylene glycol, a diethylene glycol, propylene glycol, 1,3-propanediol, 1,4-butanediol, neopentyl glycol, 1,5-pentanediol, 1,6-hexanediol, cyclohexane dimethanol, a polyethylene glycol, a polytetramethylene glycol, etc. can be mentioned, for example, and

especially ethylene glycol is desirable.

[0016] as this polyester, polyethylene terephthalate or polyethylene-2, and 6-naphthalate is high Young's modulus -- etc. -- since the ** film which is excellent in a mechanical property and is excellent in thermal properties, like heat-resistant dimensional stability is good etc. is obtained, it is desirable.

[0017] The above-mentioned polyester may be polyester which copolymerized the above-mentioned dicarboxylic acid component or the glycol component, and may be polyester which carried out little copolymerization of the multiple-valued carboxylic-acid component or polyol component of three or more organic functions in the range (for example, less than [5 mol %]) in which polyester serves as a line substantially.

[0018] Since a mechanical property, like the rigidity of a film is large in it being able to build with a conventional method and the intrinsic viscosity of polyester being 0.45 or more becomes good, this polyester is desirable.

[0019] Since slipping nature of a film is made good, the above-mentioned polyester can be made to contain organic and the inorganic particle whose mean particle diameter is about 0.01-20 micrometers as lubricant by 0.001 - 5% of the weight of the blending ratio of coal. As an example of this particle, a silica, an alumina, a kaolin, a calcium carbonate, a calcium oxide, titanium oxide, graphite, carbon black, a zinc oxide, silicon carbide, tin oxide, a bridge formation acrylic resin particle, a bridge formation polystyrene resin particle, a melamine resin particle, a bridge formation silicone resin particle, etc. can be mentioned preferably.

[0020] A coloring agent, a well-known antistatic agent, an antioxidant, organic lubricant (slipping agent), a catalyst, a fluorescent brightener, a plasticizer, a cross linking agent, an ultraviolet ray absorbent, other resin, etc. can be added if needed besides said particle.

[0021] Transparence polyester film and white polyester film can be used for the base film in this invention by the application of an antielectricity characteristic film. The light transmission after extension is 60% or more of thing, and this transparence polyester film has 80% or more of especially desirable thing. Moreover, titanium oxide, a barium sulfate, oxidation silicon, etc. are blended with polyester five to 30% of the weight, and less than 60% of thing, especially 30% or less of thing have [white polyester film] the desirable light transmission after extension. The antielectricity characteristic film of the white which used white polyester film for the base film is preferably used especially for magnetic cards.

[0022] The polyester film in this invention can be manufactured by the approach learned from the former. For example, said polyester is fused, the cast is carried out to cooling drum lifting, it considers as an unstretched film, and this unstretched film can be manufactured by the lengthwise direction, the approach of subsequently to a longitudinal direction carrying out biaxial stretching serially, or the approach of carrying out coincidence biaxial stretching to a lengthwise direction and a longitudinal direction. Furthermore, it can also extend again in a lengthwise direction and/or a longitudinal direction. Extension processing is temperature higher than the second order transition point (T_g) of polyester, and it is desirable to carry out by extending further 3 or more times more than twice in each direction. As for area draw magnification, it is desirable in that case to consider as 8 or more times and further 9 or more times. Although the upper limit of area draw magnification is based also on the application of a film, it is desirable to consider as 35 times and further 30 times. It is desirable to heat-treat after extension and to complete orientation crystallization.

[0023] In [antistatic-agent (A)] this invention, an antielectricity characteristic paint film applies the aqueous coating liquid containing the antistatic agent (A) which uses a copolymer (A-1) as a principal component at least at one side of polyester film, dries and extends, and is built.

[0024] the copolymer (A-1) in [copolymer (A-1)] this invention -- the aforementioned configuration unit (i) and (ii) -- and (iii) -- from -- it is the becoming copolymer and can obtain by the following approach etc.

[0025] For example, for introducing a configuration unit (ii) for introducing a configuration unit (i) into a copolymer (A-1), using ethylene as a monomer, an ethyl acrylate, an acrylic acid, butyl acrylate, acrylic-acid soda, acrylic-acid ammonium, a methyl methacrylate, a methacrylic acid, methacrylic-acid

butyl, etc. can be used as a monomer, and it is a configuration unit (iii). The following approach can be used in order to introduce.

[0026] That is, weight average molecular weight adds water to the ethylene acrylic ester (ethyl ester, methyl ester, propyl ester, etc.) copolymer of 10,000-500,000, within an autoclave, it is made to react under a pressurization elevated temperature, decomposition degradation is performed, and weight average molecular weight makes the ethylene acrylic acid and acrylic ester copolymer of 2,000-100,000 generate. Subsequently, this ethylene acrylic acid and acrylic ester copolymer, and N and N-dialkylamino alkylamines (for example, N and N-dimethylamino propylamine, N, and N-diethylamino propylamine etc.) can be made to be able to react, it can amidate, the 4th class alkylation reaction can be made to be able to perform finally, and the 4th class cation ion pair can be introduced.

[0027] In addition, configuration unit (iii) It is the structure shown by the aforementioned formula (III), and is a formula (III). R1 and R2 H or CH₃; R3 a carbon number -- 2 - 10 alkylene-group; -- R4 -- R5 and R6 The saturated hydrocarbon radical of 1-15 or a part of H Hydroxyl group, [a carbon number] the carbon number permuted by the alkoxy group or the glycidyl group -- saturated hydrocarbon radical; Y- of 1-15 -- halogen ion (Cl-) monochrome, such as Br-, or the Pori alkyl halide ion (CH₂ Cl-) CHCl₂- and CH₂ CH₂ Cl- etc. -- nitrate ion (NO₃-) -- Sulfate ion (HOSO₃-), alkyl sulfate ion (CH₃ OSO₃- etc.), sulfonate ion (HSO₃-), or alkyl sulfonate ion (CH₃ SO₃- etc.) are shown.

[0028] a copolymer (A-1) -- in addition, if other monomer components, such as acrylamide, N-methoxymethyl acrylamide, styrene, a vinyl chloride, and metallyl acid soda, are little, it can copolymerize.

[0029] For a configuration unit (i), a 10 - 99-mol % and configuration unit (ii) is [the 0 - 80 mol % and configuration unit (iii) of the copolymerization rate of a copolymer (A-1)] 1 - 40-mol %, and, for a configuration unit (i), a 30 - 97-mol % and configuration unit (ii) is the 0 - 70 mol % and configuration unit (iii) of a still more desirable copolymerization rate] 2 - 25-mol %.

[0030] Since the thermal resistance of an antielectricity characteristic paint film runs short of the rates of a configuration unit (i) less than [10 mol %], if recovery nature is inferior and 99-mol % is exceeded, the adhesive property of a paint film and a base film will fall. Moreover, if a configuration unit (ii) exceeds 80-mol %, the antielectricity characteristic of an antielectricity characteristic paint film and thermal resistance run short. Furthermore, less than [1 mol %], the antielectricity characteristic of an antielectricity characteristic paint film runs short of configuration units (iii), and if 40-mol % is exceeded, the thermal resistance of an antielectricity characteristic paint film runs short.

[0031] The copolymerization rate of a copolymer (A-1) In addition, configuration unit (i) 50 - 96-mol %, It consists of configuration unit (ii) 0 25-mol % and configuration unit (iii) 4 - 25-mol %. Y in said formula (III) - R₇ SO₃ - In case of the alkyl sulfonate ion (a carbon number R₇ [however,] saturated hydrocarbon radical of 1-5) shown Since it becomes that in which the adhesive property of a paint film and a base film and the antielectricity characteristic of a paint film were excellent in, and recovery nature was extremely excellent since especially the thermal resistance of a paint film was good, it is desirable.

[0032] although the average molecular weight (number average molecular weight) of a copolymer (A-1) is arbitrary, it is 1,000-300,000 -- ** -- it is desirable. Since the viscosity of aqueous coating liquid will become high too much and it will be hard coming to apply to a film at homogeneity if there is an inclination for the tooth-back imprint nature of an antistatic agent (A) to get worse that this average molecular weight is less than 1,000 and average molecular weight exceeds 500,000, it is not desirable.

[0033] Since it becomes good [an antielectricity characteristic] that it is what contains a copolymer (A-1) and a copolymer (A-2) as a component, a [copolymer (A-2)] antistatic agent (A) is desirable. As for the rate of a copolymer (A-2), it is desirable that it is what does not exceed a copolymer (A-1).

[0034] This copolymer (A-2) is a copolymer which has a phosphate radical and/, or a sulfonate radical in intramolecular. This copolymer (A-2) is obtained by carrying out the polymerization of the monomer which has a partial saturation double bond in intramolecular, and has a phosphate radical and/, or a sulfonate radical in intramolecular.

[0035] As a monomer which has a partial saturation double bond in intramolecular, and has a phosphate

radical in intramolecular, the following compound can be mentioned, for example.

[0036]

[Formula 7] $\text{CH}_2 = \text{CHOR}_9 \text{OP}(=\text{O})(\text{OM})_2 \text{CH}_2 = \text{CHOR}_9 \text{OP}(=\text{O})(\text{OM})(\text{OR}_9)$
 $\text{CH}_2 = \text{CHCONH}(\text{CH}_2)_3 \text{OP}(=\text{O})(\text{OM})_2 \text{CH}_2 = \text{CHCONH}(\text{CH}_2)_3 \text{OP}(=\text{O})(\text{OM})(\text{OR}_9)$

[Here, as for 2 - 10 alkylene group or phenylene group; R_9 , in R_8 , a carbon number shows a metallic element, univalent ammonium, or the univalent the class [1st] - 4th class ammonium, as for the alkyl group of carbon numbers 1-4, or polyalkylene oxide radical; M .]

[0037] Moreover, as a monomer which has a partial saturation double bond in intramolecular, and has a sulfonate radical, the following compound can be mentioned, for example.

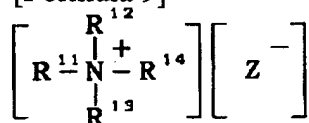
[0038]

[Formula 8] $\text{CH}_2 = \text{CHSO}_3 \text{MCH}_2 = \text{CHR}_{10}\text{SO}_3 \text{M}$ [-- here -- M -- univalent metallic element, ammonium, or 1st class - the 4th --] class ammonium; R_{10} indicate - C_6H_4 - (o-phenylene group, m-phenylene group, or p-phenylene group) to be

[0039] [the compound (A-3) which has the 4th class amine salt] -- since it becomes good [the antielectricity characteristic of an antielectricity characteristic paint film] that it is what contains as a component a copolymer (A-1) and the compound (A-3) which has the 4th class amine salt, an antistatic agent (A) is desirable again. As for the rate of a compound (A-3) of having the 4th class amine salt, it is desirable that it is what does not exceed a copolymer (A-1). The compound (A-3) which has the 4th class amine salt of this is a compound shown by the following general formula.

[0040]

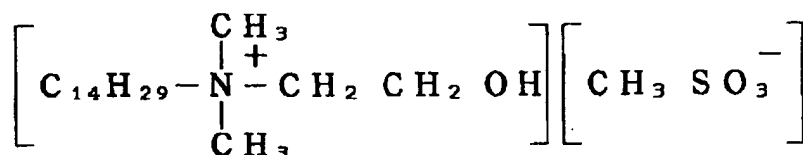
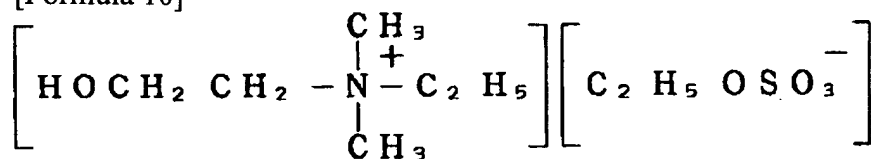
[Formula 9]



[0041] By the general formula of [above, a carbon number R_{11} , R_{12} , R_{13} , and R_{14} The alkyl group of 1-30, Alkyl group or polyalkylene oxide radical; Z which has an aryl group, an aralkyl radical, an alicycle group machine, and a hydroxyl group - NO_3^- , $\text{R}_{15}\text{OSO}_3^-$, $\text{R}_{15}\text{SO}_3^-$, and Cl^- Or it is $\text{R}_{15}\text{COO}^-$ (a carbon number R_{15} [however,] the alkyl group, the aryl group, aralkyl radical, or alicycle group machine of 1-12).]

[0042] which can mention the following compound as an example of this compound

[Formula 10]



[0043] To the antielectricity characteristic paint film in [binder resin (B)] this invention, in order to make firmer adhesion with a paint film and a base film, it is desirable that an antistatic agent (A) and binder resin (B) are contained. It is desirable to use one or more sorts of resin which can illustrate polyester resin (B-1), acrylic resin (B-2), acrylic denaturation polyester resin (B-3), etc. as this binder resin, and is chosen from these resin. Since coloring of a remanufactured film can be controlled in case an adhesive property will be good, and will collect antielectricity characteristic films and will carry out a reuse if it is desirable and polyester resin (B-1) and acrylic resin (B-2) are used together since the

adhesive property of an antielectricity characteristic paint film and a base film will become good, if especially polyester resin (B-1) or acrylic resin (B-2) is used, it is desirable. the case where polyester resin (B-1) and acrylic resin (B-2) are used together -- polyester resin (B-1) -- more **** for amounts than acrylic resin (B-2) -- things are desirable.

[0044] the line to which [polyester resin (B-1)] polyester resin (B-1) makes a dicarboxylic acid component and a glycol component a constituent -- it is polyester.

[0045] As this dicarboxylic acid component, a terephthalic acid, isophthalic acid, naphthalene dicarboxylic acid, 4, 4'-diphenyl dicarboxylic acid, an adipic acid, a sebacic acid, dodecane dicarboxylic acid, a hexahydro terephthalic acid, etc. can be illustrated preferably.

[0046] Moreover, as a glycol component, ethylene glycol, a diethylene glycol, propylene glycol, 1,3-propanediol, 1,4-butanediol, neopentyl glycol, 1,5-pentanediol, 1,6-hexanediol, dipropylene glycol, triethylene glycol, a bisphenol A-alkylene oxide adduct, a hydrogenation bisphenol A-alkylene oxide adduct, 1, 4-cyclohexane dimethanol, a polyethylene glycol, a polytetramethylene glycol, etc. can be illustrated preferably.

[0047] In order to give a hydrophilic property to this polyester resin (B-1), the component which has a sulfonate radical can be copolymerized. If a hydrophilic property is given to polyester resin (B-1), the dispersibility in the inside of aqueous coating liquid will become good. As this component, 5-Na sulfoisophtharate, 5-K sulfoisophtharate, etc. can be mentioned, for example.

[0048] Polyester resin (B-1) may carry out small quantity (for example, less than [5 mol %]) copolymerization of the multiple-valued compound of three or more organic functions in the range which serves as a linear polymer substantially. As this multiple-valued compound of three or more organic functions, trimellitic acid, pyromellitic acid, dimethylol propionic acid, a glycerol, trimethylol propane, etc. can be illustrated.

[0049] [Acrylic resin (B-2)] acrylic resin (B-2) An ethyl acrylate, a methyl acrylate, an acrylic acid, butyl acrylate, Acrylic-acid soda, acrylic-acid ammonium, ethyl methacrylate, A methyl methacrylate, a methacrylic acid, methacrylic-acid butyl, glycidyl methacrylate, 2-hydroxyethyl acrylate, acrylamide, methacrylamide, It is the polymer or copolymer which uses as a principal component the acrylic monomer illustrated by N-methoxymethyl acrylamide, N-methylol acrylamide, etc. For example, you may be the copolymer which copolymerized copolymerization components, such as styrene, alpha methyl styrene, sodium styrenesulfonate, a vinyl chloride, a vinylidene chloride, vinyl acetate, vinyl ether, vinyl sulfonic-acid soda, and metallyl acid soda.

[0050] [Acrylic denaturation polyester resin (B-3)] acrylic denaturation polyester resin (B-3) Under existence of said polyester resin, an ethyl acrylate, a methyl acrylate, An acrylic acid, butyl acrylate, acrylic-acid soda, acrylic-acid ammonium, Ethyl methacrylate, a methyl methacrylate, a methacrylic acid, methacrylic-acid butyl, Glycidyl methacrylate, 2-hydroxyethyl acrylate, acrylamide, It is the graft copolymer which was made to carry out the polymerization of the acrylic monomer illustrated by methacrylamide, N-methoxymethyl acrylamide, N-methylol acrylamide, etc., and was built. Monomers, such as styrene, alpha methyl styrene, sodium styrenesulfonate, a vinyl chloride, a vinylidene chloride, vinyl acetate, vinyl ether, vinyl sulfonic-acid soda, and metallyl acid soda, may be included as a copolymerization component.

[0051] Since the adhesive property of a paint film and a base film is adjusted to a [other binder resin] antielectricity characteristic paint film, binder resin other than the above can be blended, and as this resin, polyurethane resin, an epoxy resin, vinyl resin, polyether resin, water soluble resin, etc. can be mentioned.

[0052] Since adhesion with a paint film and a base film is made firm and blocking resistance of an antielectricity characteristic film is made good, a surface active agent (C) can be blended with the antielectricity characteristic paint film in [surface-active-agent (C)] this invention. As this surfactant (C), for example An alkylene oxide homopolymer, An alkylene oxide copolymer, a fatty alcohol alkylene oxide addition product, A long-chain aliphatic series permutation phenol alkylene oxide addition polymerization object, polyhydric-alcohol fatty acid ester, The Nonion system surfactants, such as long-chain aliphatic series amide alcohol, the compound which has quarternary ammonium salt, A cation

system or anion system surfactants, such as a compound which has alkyl pyridinium salt, and a compound which has a sulfonate, etc. can be mentioned. Since the effectiveness as opposed to the adhesive property of a paint film and a base film or the blocking resistance of an antielectricity characteristic film in especially a nonionic surface active agent is excellent, it is desirable.

[0053] Although the antielectricity characteristic paint film in [antielectricity characteristic paint film] this invention is a paint film containing the aforementioned antistatic agent (A), it is desirable that it is the paint film which consists of a constituent which contains binder resin (B) further. In order that the rate of the antistatic agent (A) contained in an antielectricity characteristic paint film may make an antielectricity characteristic good, it is desirable that it is 5 % of the weight or more, and it is still more desirable that it is 10 % of the weight or more. Antielectricity characteristics run short that the rate of an antistatic agent (A) is less than 5 % of the weight.

[0054] The antielectricity characteristic paint film in this invention The aforementioned (antistatic-agent A) 10-80 % of the weight, It consists of a constituent which contains less than [(Surfactant C) 25 % of the weight] in a list binder resin (B) 20 - 80% of the weight. the configuration (unit i) 60-95 mol an antistatic agent (A) is indicated to be by said formula (I) -- % -- said formula (II) (the inside of a formula (II), R1, and R2 -- H or CH₃; X -- H --) [however,] The configuration unit (ii) 0 a carbon number is indicated to be by the saturated hydrocarbon radical of 1-6 - 25-mol % and said type (III) (however, among a formula (III)) R1 and R2 H or CH₃ ; R3 a carbon number -- alkylene group [of 2-10]; -- R4 -- R5 and R6 A carbon number is saturated hydrocarbon radical; Y of 1-5. - R7SO₃ - Alkyl sulfonate ion shown, R7 It is the copolymer (henceforth "a copolymer A-1-1") which consists of 5-15 mol (iii) % of configuration units a carbon number is indicated to be by the saturated hydrocarbon radical of 1-5. Binder resin (B) is acrylic resin (B-2) (henceforth "acrylic resin (B-2-1)) of 20-100 degrees C of second order transition points. That the surface energy of an antielectricity characteristic paint film is [37 - 73 dyne/cm and a water contact angle] 40 - 110 degrees Especially since the adhesive property of a paint film and a base film, the blocking resistance of an antielectricity characteristic film, thermal resistance, and the antielectricity characteristic in low humidity are excellent when an antielectricity characteristic film is used for example, for magnetic cards, it is desirable.

[0055] In the above-mentioned antielectricity characteristic paint film, the adhesive property of a paint film and a base film and the blocking resistance of an antielectricity characteristic film become that the adhesive property of a paint film and a base film and an antielectricity characteristic are good in an antistatic agent (A) being 10 - 80% of the weight of the range, an antielectricity characteristic and the adhesive property of a paint film and a base film are good in binder resin (B) being 20 - 80% of the weight of the range, and a surface active agent (C) is 25 or less % of the weight with a good thing.

[0056] the structure where, as for the copolymer (A-1-1) used for the above-mentioned antielectricity characteristic paint film, said formula (II) is drawn from a methyl methacrylate, ethyl methacrylate, a methyl acrylate, an ethyl acrylate, and butyl acrylate -- it is -- Y- in said formula (III) CH₃ SO₃- and C₂ H₅ SO₃- Or C₃ H₇ SO₃- it is -- things are desirable.

[0057] Moreover, the second order transition point of the acrylic resin (B-2-1) used for the above-mentioned antielectricity characteristic paint film is 20-100 degrees C. It is desirable that it is the copolymer of the partial saturation monomer which uses an acrylic ester system monomer as a principal component. For example, a methyl methacrylate, ethyl methacrylate, methacrylic-acid butyl, A methyl acrylate, an ethyl acrylate, butyl acrylate, ethyl crotonate, Glycidyl methacrylate, acrylic-acid-2-hydroxyethyl, 2-ethylhexyl acrylate, Acrylamide, methacrylamide, an acrylic acid, a methacrylic acid, acrylic-acid soda, Methacrylic-acid potash, acrylic-acid ammonium, N-methylol acrylamide, Monomers, such as N-methoxymethyl acrylamide, are used as a principal component, and if required, the copolymer which uses a vinyl chloride, vinyl acetate, styrene, vinyl ether, a butadiene, an isoprene, vinyl sulfonic-acid soda, etc. for a copolymerization component, and is obtained can be mentioned. When blocking resistance is inferior and there are things, when the second order transition temperature of acrylic resin (B-2-1) is less than 20 degrees C, and it exceeds 100 degrees C, *****-proof may fall.

[0058] When a long film is rolled in the shape of a roll and blocking resistance keeps it, it is a property which adhesion (blocking) of films cannot produce easily, and *****-proof is a property that a paint

film cannot be easily desorbed from a base film (delete) here, when rolls receive friction or the film which painted the paint film receives pressurization in a processing process.

[0059] Moreover, as for the average molecular weight of a copolymer (A-1-1), it is desirable that it is 3,000-1,000,000.

[0060] Furthermore, since the surface energy of an antielectricity characteristic paint film becomes that in which the antielectricity characteristic and the adhesive property with ultraviolet-rays hardenability ink were excellent in it being 40 - 110 degrees, 37 - 73 dyne/cm and its water contact angle are desirable. The antielectricity characteristic paint film from which surface energy and a water contact angle serve as the above-mentioned range can be obtained by combining a copolymer (A-1-1), acrylic resin (B-2-1), and the presentation rate of a surfactant (C) within the limits of the above.

[0061] For example, since a copolymer (A-1-1) acts in the direction which raises the surface energy of an antielectricity characteristic paint film, it can blend acrylic resin (B-2-1), it can add a surfactant (C) if needed further, and can adjust it within the limits of the above. Moreover, since a copolymer (A-1-1) acts in the direction which enlarges the water contact angle of an antielectricity characteristic paint film, it can blend acrylic resin (B-2-1), it can add a surfactant (C) if needed further, and can adjust it within the limits of the above.

[0062] In [aquosity coating liquid] this invention, although an antielectricity characteristic paint film is painted using the aquosity coating liquid containing said antistatic agent (A), since slipping nature of an antielectricity characteristic paint film front face is made good at this aquosity coating liquid and blocking resistance of a film is made good, lubricant can be added. As this lubricant, particles, such as polystyrene resin, acrylic resin, melamine resin, silicone resin, a fluororesin, a urea-resin, benzoguanamine resin, polyamide resin, and polyester resin, can be mentioned, for example. As long as the particle of these resin is contained in an antielectricity characteristic paint film by the shape of a particle, it may be thermoplasticity or may be a thermosetting thing.

[0063] Antistatic agents other than a surfactant, an antioxidant, and an antistatic agent (A), a coloring agent, a pigment, a fluorescent brightener, a plasticizer, a cross linking agent, a slipping agent (slipping nature grant agents, such as a wax), an ultraviolet ray absorbent, etc. can be further blended with aquosity coating liquid as other components.

[0064] The solid content concentration of aquosity coating liquid has 1 - 30 desirable % of the weight, and its 2 - 20 % of the weight is especially desirable. If solid content concentration is in this range, the viscosity of aquosity coating liquid will become a thing suitable for spreading. The aquosity coating liquid used for this invention can be used with the gestalt of arbitration, such as a water solution, a water dispersion, and emulsified liquid. Moreover, the little solvent may be contained in aquosity coating liquid.

[0065] Antistatic agents other than a surfactant, an antioxidant, and an antistatic agent (A), a coloring agent, a pigment, a fluorescent brightener, a plasticizer, a cross linking agent, a slipping agent (slipping nature grant agents, such as a wax), an ultraviolet ray absorbent, etc. can be further blended with aquosity coating liquid as other components.

[0066] The solid content concentration of aquosity coating liquid has 1 - 30 desirable % of the weight, and its 2 - 20 % of the weight is especially desirable. If solid content concentration is in this range, the viscosity of aquosity coating liquid will become a thing suitable for spreading. The aquosity coating liquid used for this invention can be used with the gestalt of arbitration, such as a water solution, a water dispersion, and emulsified liquid. Moreover, the little solvent may be contained in aquosity coating liquid.

[0067] Although said aquosity coating liquid is applied at least to one side of polyester film and an antielectricity characteristic paint film is painted on it stoving and by extending in [painting of antielectricity characteristic paint film] this invention As the method of application of aquosity coating liquid, the coating method of well-known arbitration is applicable. For example, the gravure coat method, The reverse roll coat method, the die coat method, the kiss coat method, the reverse kiss coat method, independent in the offset gravure coat method, the MAIYA bar coat method, the roll brush method, a spray coating method, the Ayr knife coat method, the sinking-in method, the curtain coat

method, etc. -- or it can combine and apply. The WET coverage of aqueous coating liquid is film 1m² it is running. 2-especially 12g are [1-20g of hits] desirable. Since desiccation becomes it easy that coverage is this range and it is hard to produce spreading spots, it is desirable.

[0068] With the polyester film which applies aqueous coating liquid by this invention Are polyester film which can be extended, for example, thermofusion of the polyester is carried out. Then The uniaxial stretched film which made either the lengthwise direction (longitudinal direction) or the longitudinal direction (cross direction) extend the unstretched film; unstretched film made into the shape of a film; The biaxially oriented film which made the longitudinal direction or the lengthwise direction extend serially the uniaxial stretched film of a lengthwise direction or a longitudinal direction (it can extend further), Or the biaxially oriented film (it can extend further) which carries out coincidence extension of the unstretched film in the two directions of a lengthwise direction and a longitudinal direction can be mentioned. The thickness of the polyester film after this extension has desirable 1-300 micrometers.

[0069] Since aqueous coating liquid can manufacture an antielectricity characteristic film efficiently [it becomes what has the firm adhesive property of an antielectricity characteristic paint film to apply to an uniaxial stretched film, especially the uniaxial stretched film of a lengthwise direction among the polyester film in which said extension is possible, and], it is desirable. For example, after carrying out thermofusion of the polyester, extrude in the shape of a sheet, cooling, considering as an unstretched film, extending this unstretched film to a lengthwise direction and considering as an uniaxial stretched film, aqueous coating liquid is applied, it extends in a longitudinal direction, drying, and if , the antielectricity characteristic film which was re-extended further length and horizontally and which carried out the postheat treatment and painted the antielectricity characteristic paint film is built.

[0070] After applying aqueous coating liquid in this invention, since considering as 80-160 degrees C can dry coating liquid quickly, the temperature to dry is desirable. Heating for this desiccation serves as heating of the process which extends polyester film, and that of things is possible. Moreover, temperature which heat-treats polyester film can be made into 180-250 degrees C.

[0071] Especially the thickness of the painted antielectricity characteristic paint film has desirable 0.015-1 micrometer 0.005-3 micrometers. Since an antielectricity characteristic may be insufficient when the thickness of a paint film is thinner than 0.005 micrometers, and it will become easy to delete a paint film if it exceeds 1 micrometer, it is not desirable.

[0072] The antielectricity characteristic film of [magnetic-card] this invention is useful as an object for magnetic cards, and the antielectricity characteristic film of the white which used white polyester film for the base film is preferably used especially for magnetic cards. In addition, a magnetic card here is a card which prepared the magnetic-recording layer (magnetic layer) in one side of for example, an antielectricity characteristic film, and prepared the printing layer in another field in UV ink etc. This magnetic layer can be painted by applying to a base film the magnetic coating which consists of a magnetic oxide of iron, denaturation vinyl chloride resin, polyurethane resin, poly isocyanate, a dispersant, etc., and drying, for using it as a magnetic card, it can prepare a protective layer further on a magnetic layer, and it can be used. Moreover, the printing layer in UV ink etc. can print the ink which blended the photosensitizer, the coloring agent, etc. with the vinyl polymer which has an acrylic radical at the polyurethane oligomer which has an acrylic radical at the end, or the end to the antielectricity characteristic paint film painting side of a base film, and can prepare it by irradiating ultraviolet rays and stiffening them.

[0073] Since 50-300 micrometers of thickness of the antielectricity characteristic film used for a magnetic card become good [a 150-250-micrometer thing / the rigidity of a card] especially, for example, it is desirable.

[0074] [Transparence antielectricity characteristic film] Although the transparence antielectricity characteristic film which used transparence polyester film for the base film is preferably used for magnetic-recording ingredients and electronic ingredients, such as a magnetic tape and a magnetic disk, a graphic film, a platemaking film, and OHP films again and the thickness of a film changes by the application, 15-160 micrometers of 25-100-micrometer things are used especially preferably, for example.

[0075]

[Example] Hereafter, an example is given and this invention is further explained to a detail. Each characteristic value was measured by the following approach. In addition, the average molecular weight in an example means number average molecular weight.

[0076] 1. After holding a surface specific resistance sample film by RH 21 degree-Cx52% for 19 hours, the surface specific resistance of a film spreading side was measured using oscillating capacity mold potentiometry machine TR-84M mold (the Takeda Riken make). In addition, applied voltage was set to 100Volt(s).

[0077] 2. It is the aquosity liquid spreading side and the non-applying field of a tooth-back imprint nature sample film in piles 6 kg/cm² After adding the load and leaving it on condition that RH 50 degree-Cx70% for 8 hours, the water contact angle (theta: substitution property of tooth-back imprint nature) of a non-applying field was measured, and the following criteria estimated.

A: $\theta \geq 55$ degrees B: 55 degrees [of tooth-back imprint nature fitness] $> \theta \geq 48$ degrees .. Tooth-back imprint nature and ** good C: $48 - \text{degree} > \theta$.. The poor tooth-back imprint nature water contact angle turned the aquosity **** spreading side up, set the above-mentioned sample film in the contact angle measuring device (made in Elma), and measured it by reading the contact angle 1 minute after dropping waterdrop on conditions with a temperature of 23 degrees C. In addition, the water contact angle of a film without a tooth-back imprint is 60-75 degrees, the water contact angle of a film with good tooth-back imprint nature is 55 degrees or more, and the water contact angle of a film with a remarkable (poor tooth-back imprint nature) tooth-back imprint is less than 48 degrees.

[0078] 3. Whenever [Remanufactured Film Coloring-] (Recovery Nature)

The film which does not prepare a paint film was ground, and it fused and chip-ized at about 300 degrees C with the extruder. Subsequently, melting film production was carried out using the obtained chip, and the blank film was created. Whenever [this film coloring-] was made into the blank. On the other hand, the sample film which prepared the paint film was ground, and it fused and chip-ized at about 300 degrees C with the extruder. Subsequently, melting film production was carried out using the obtained chip, and the remanufactured film was created. The following criteria estimated whenever [this film coloring-].

[0079]

whenever [Rank A:coloring] -- about the same rank [as a blank film] B: -- rank C: which the film is coloring a little -- [0080] as for which whenever [film coloring-] lacks in practicality in size 4. After adding applied-voltage 10KVolt to the paint film painting side of the sample film held by RH for 10 hours saturated zone electrical-potential-difference [of 22 degrees C] x44%, the band electrical potential difference of a painting side was measured with time, and the band electrical potential difference at the time of change of a band electrical potential difference no longer being accepted was made into the saturated zone electrical potential difference. In addition, the following criteria estimated from the measured value of a saturated zone electrical potential difference.

[0081]

A: $1\text{kV} \geq$ saturated zone electrical potential difference of ranks (it does not become a problem practically)

B: $2\text{kV} \geq$ saturated zone electrical-potential-difference [of ranks] $> 1\text{kV}$ (it becomes a problem a little practically)

Rank C: Saturated zone electrical-potential-difference $> 2\text{kV}$ (it becomes a problem practically)

[0082] 5. Ultraviolet curing ink (mixture of bis-acrylic polyurethane oligomer, a photopolymerization initiator, a photosensitizer, and a red coloring agent) was applied to the paint film painting side of an ink adhesive property sample film by the thickness of 8 micrometers, and after irradiating ultraviolet rays and stiffening them, the Scotch tape was stuck on the hardening ink layer front face, the desquamative state between each class at the time of applying the exfoliation force to a Scotch tape was observed, and it evaluated as follows.

[0083] Rank A: Between the Scotch tape and the ink layer exfoliated (an ink adhesive property is good).

Rank B: Between the paint film and the ink layer exfoliated in the shape of cohesive failure partially (an ink adhesive property and ** are good).

Rank C: Between the paint film and the ink layer exfoliated in the shape of a layer (a poor ink adhesive property).

[0084] 6. It quenched, after heating and fusing sample film 12g which prepared the heat-resistant paint film at 300 degrees C under nitrogen-gas-atmosphere and holding for 15 minutes, and the disc-like sample was built, and whenever [coloring] was observed. The disc-like sample was separately built with the same conditions using the film which does not prepare a paint film, and it considered as the blank. The rank A evaluated by the comparison of whenever [coloring-with blank] as follows: **** yellow with whenever [coloring / almost equivalent to a blank] (heat-resistant fitness)

Rank B: Whenever [coloring] colors it light yellow a little from a blank (thermal resistance and ** are poor).

Rank C: Whenever [coloring] is more remarkable than a blank and colors it yellow (heat-resistant defect).

[0085] 7. Using the film sample cut to 10mm width of face of blocking resistance, pile up the paint film painting side and the non-painting field of a film, and it is 50kg/cm². After adding the load and holding at 50 degrees C for 10 hours, the exfoliation force of a painting side and a non-painting field was measured, and blocking resistance was evaluated as follows.

[0086] Rank A: Exfoliation force ≤ 7 g (blocking resistance is good)

Rank B: $7 < \text{exfoliation force} \leq 10$ g (blocking resistance and ** are poor)

Rank C: $10 < \text{exfoliation force}$ (poor blocking resistance)

[0087] 8. After making it run 80m where it applied the paint film painting side of a film to the fixed bar with a diameter of 10mm made from cylindrical stainless steel and a 200g load is added using the film sample cut to 20mm width of face of *****-proof, the face powder of a paint film adhering to a bar was observed, and *****-proof was evaluated as follows.

[0088]

Rank A: There is no adhesion of face powder in a bar (*****-proof is good).

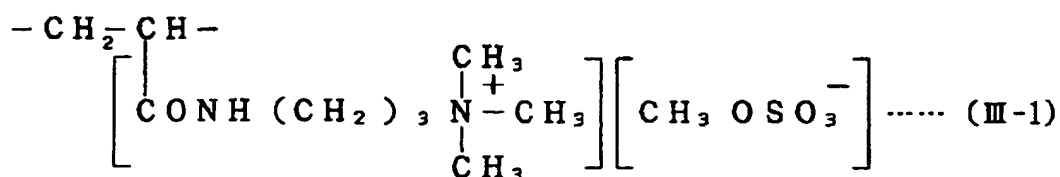
Rank B: Face powder adheres to a bar a little. (****-proof and ** are poor)

Rank C: Face powder is abundant adhesion to a bar. (poor ****-proof)

[0089] The polyethylene terephthalate of [example 1] intrinsic viscosity 0.63 was fused, and the cast was carried out to cooling drum lifting, and subsequently to a lengthwise direction, it extended 3.6 times at 92 degrees C, and considered as the uniaxial stretched film. On one side of this uniaxial stretched film, 11 mol % of 76 mol % and ethyl-acrylate components of ethylene components, The four mol % and following type of ethyl methacrylate components (III-1) 70 % of the weight (a-1) of component (-[CH₂ CHCONH(CH₂)₃ N+3 (CH₃)] and [CH₃ OSO₃-]) 9 mol % copolymers shown, A dicarboxylic acid component A terephthalic acid (54-mol %) and isophthalic acid (46-mol %), A glycol component Ethylene glycol (42-mol %), a diethylene glycol (12-mol %), Neopentyl glycol (41-mol %) And a polyethylene glycol The 5-% of the weight aqueosity liquid of the constituent which becomes the 18 % of the weight (b-1) list of polyester resin which is (five-mol%) of copolymer (average molecular weight: 19,700) from 12 % of the weight (the repeat number of unit of a polyoxyethylene = 9) (c-1) of polyoxyethylene nonyl phenyl ether It applied by the gravure coating machine. Subsequently, the film with a thickness of 75 micrometers which extended after desiccation at 98 degrees C, extended the spreading film 3.8 times in the longitudinal direction at 105 degrees C, heat-treated it, and painted the antielectricity characteristic paint film was built. The thickness of the antielectricity characteristic paint film of a film was 0.34 micrometers, and light transmittance was 84%. The property of this film is shown in Table 1.

[0090]

[Formula 11]



[0091] The property of the film obtained like the example 1 is shown in Table 1 except not applying [example 1 of comparison] aqueosity liquid.

[0092] The property of a film of having obtained the presentation of examples 2-7 and [examples 2-3 of comparison] coating liquid and spreading thickness like the example 1 in Table 1 except having changed like a publication is shown in Table 1.

[0093] The polyethylene terephthalate of the intrinsic viscosity 0.65 which contains [example 8] titanium oxide 12% of the weight was used, film thickness was set to 150 micrometers and the film whose light transmission is 2% like an example 1 was obtained except having changed like the publication to Table 1 of the presentation of coating liquid, and spreading thickness. The property of this film is shown in Table 1.

[0094] The property of a film of having obtained the presentation of [examples 9-11] coating liquid and spreading thickness like the example 1 in Table 1 except having changed like a publication is shown in Table 1.

[0095]

[Table 1]

	制電性塗膜組成 (重量%) *1			塗膜厚さ (μm)	フイルム特性		
	帯電防止剤		バインダー樹脂		表面固有抵抗 (Ω)	背面転写性	再生フイルム 着色性
実施例1	a-1 (70%)	—	b-1 (18%)	0.34	7.4×10^9	A	B
実施例2	a-1 (70%)	—	b-1 (18%)	0.24	9.3×10^9	A	B
実施例3	a-1 (70%)	—	b-1 (18%)	0.18	1.2×10^{10}	A	B
実施例4	a-1 (68%)	—	b-2 (20%)	0.29	8.4×10^9	A	B
実施例5	a-1 (68%)	—	b-2 (20%)	0.18	9.7×10^9	A	B
実施例6	a-2 (58%)	—	b-3 (20%)	0.32	1.1×10^{10}	A	B
実施例7	a-2 (58%)	—	b-3 (20%)	0.19	1.4×10^{10}	A	B
実施例8	a-1 (70%)	—	b-1 (18%)	0.28	8.4×10^9	A	B
実施例9	a-1 (88%)	—	—	0.19	6.4×10^9	A	B
実施例10	a-4 (65%)	—	b-1 (23%)	0.29	9.6×10^9	A	B
実施例11	a-1 (62%)	a-3 (15%)	b-1 (11%)	0.33	2.4×10^{10}	A	B
比較例1	—	—	—	—	7.8×10^{15}	A	A
比較例2	a-3 (22%)	—	b-1 (66%)	0.22	3.4×10^{13}	A	A
比較例3	a-5 (55%)	—	b-2 (33%)	0.18	2.4×10^{12}	C	B

*1 c-1: ポリオキシエチレンノニルフェニルエーテル (12重量%)

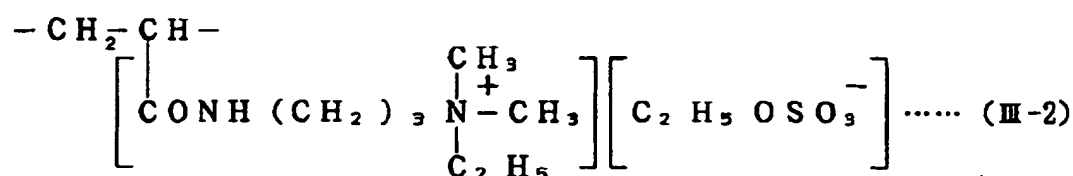
[0096] In the antielectricity characteristic paint film presentation of Table 1, the component [c-1] of an antistatic agent [a-1], [a-2], [a-3], [a-4], [a-5], binder resin [b-1], [b-2], [b-3], and others is a copolymer, a following compound, or following mixture, respectively.

[0097] [a-1]: Four mol % and said type (III-1) of 11 mol % and ethyl methacrylate components of 76 mol % and ethyl-acrylate components of ethylene components Nine mol (-[CH₂CHCONH(CH₂)₃N⁺(CH₃)₂](CH₃)] and [CH₃OSO₃⁻]-) % of copolymer of components shown (average molecular weight: 7,200)

[a-2]: five mol ([CH₂CHCONH(CH₂)₃N⁺(CH₃)₂](CH₃) C two H₅] and -[C₂H₅OSO₃⁻]-) % of the copolymer of components (average molecular weight: 6,400) () shown by the two mol % and following formula (III-2) of seven mol % and ethyl methacrylate components of 86 mol % and ethyl-acrylate components of ethylene components

[0098]

[Formula 12]



[0099] [a-3]: Seven mol % of the copolymer of six mol % and 2-hydroxyethyl acrylate components of 42 mol % and methyl-acrylate components of 45 mol % and sodium styrenesulfonate components of styrene components (average molecular weight: 54,600)

[a-4]: 79 mol % and said type (III-1) of ethylene components 21 mol (-[CH₂CHCONH(CH₂)₃N⁺(CH₃)] and [CH₃OSO₃⁻]) % of copolymer of components shown (average molecular weight: 7,700)

[a-5]: 82 % of the weight of octyl sodium sulfate, mixture of 18 % of the weight of DESHIRU benzenesulfonic acid KAUMU.

[0100] [b-1]: For a dicarboxylic acid component, a terephthalic acid (54-mol %) and isophthalic acid (46-mol %), and a glycol component are the copolymer (average molecular weight: 19,700) of ethylene glycol (42-mol %), a diethylene glycol (12-mol %), neopentyl glycol (41-mol %), and a polyethylene glycol (five-mol %).

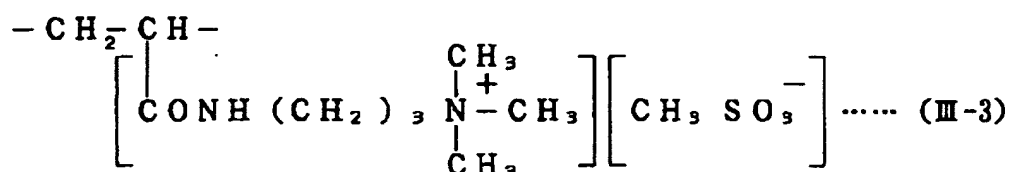
[b-2]: Polyester [b-1] 61-% of the weight and 16 mol [of ethyl-acrylate components] %, 53 mol % of four mol % and methyl-methacrylate components of acrylic-acid potassium components, As opposed to 39 % of the weight of eight mol % of copolymers [mixture [b-3]:polyester [b-1] 58% of the weight of] of seven mol % and N-methoxymethyl acrylamide components of 12 mol % and 2-hydroxyethyl acrylate components of glycidyl methacrylate components A methyl acrylate (19-mol %), The copolymer which carried out the graft polymerization of acrylic-acid ammonium (eight-mol %), ethyl methacrylate (62-mol %), and the 42 % of the weight (11-mol %) of the glycidyl methacrylates (average molecular weight: 41,500)

[c-1]: Polyoxyethylene nonyl phenyl ether (the repeat number of unit of a polyoxyethylene = 9)

[0101] The polyethylene terephthalate of [example 12] intrinsic viscosity 0.62 was fused, the cast was carried out to cooling drum lifting, subsequently to a lengthwise direction, it extended 3.4 times at 93 degrees C, and the uniaxial stretched film was obtained. On one side of this uniaxial stretched film, 86 mol % of ethylene components, The eight mol % and following type of ethyl-acrylate components (III-3) 38 % of the weight (a-6: average molecular weight 5,500) of six mol (-[CH₂CHCONH(CH₂)₃N⁺(CH₃)] and [CH₃SO₃⁻]) % of copolymers of components shown, A dicarboxylic acid component A terephthalic acid (56-mol %) and isophthalic acid (44-mol %), A glycol component Ethylene glycol (72-mol %), a diethylene glycol (ten-mol %), 9 % of the weight (b-4) of polyester resin which is the copolymer (average molecular weight: 18,500) of neopentyl glycol (12-mol %) and a polyethylene glycol (six-mol %), 39 mol % of 51 mol % and ethyl-acrylate components of methyl-methacrylate components, Four mol % of acrylic-acid hydroxyethyl components And six mol % of copolymer of N-methylol acrylamide components (average molecular weight: The 5-% of the weight aqueous liquid of the presentation which becomes the 43 % of the weight (b-5) list of acrylic resin which is 45,500) from 10 % of the weight (the repeat number of unit of a polyoxyethylene = 9:c-1) of polyoxyethylene nonylphenyl ether was applied by the gravure coating machine. Subsequently, it extended after desiccation at 102 degrees C, the spreading film was extended 3.9 times in the longitudinal direction at 105 degrees C, and the spreading film with a thickness of 75 micrometers which heat-treated at 225 degrees C and painted the antielectricity characteristic paint film was built. The antielectricity characteristic paint film thickness of this film was 0.13 micrometers, and light transmission was 88%. The property of this film is shown in Table 2.

[0102]

[Formula 13]



[0103] The property of the film obtained like the example 12 is shown in Table 2 except not applying [example 4 of comparison] aqueous liquid.

[0104] The property of a film of having obtained the presentation of examples 13-18 and [example 5 of comparison] coating liquid and spreading thickness like the example 12 in Table 2 except having changed like a publication is shown in Table 2.

[0105] The polyethylene terephthalate of the intrinsic viscosity 0.62 which contains [example 19] titanium oxide 11% of the weight was used for the base film, film thickness was set to 180 micrometers and the film whose light transmission is 1% like an example 12 was obtained except having changed like the publication to Table 2 of the presentation of coating liquid, and spreading thickness. The property of this film is shown in Table 2.

[0106] The film obtained in the [example 20] example 12 was ground, and the film which painted the antielectricity characteristic paint film like the example 12 was obtained except having used the chip-sized ingredient. There was little coloring and the obtained film had the good hue.

[0107] The surface specific resistance value of the paint film painting side of the film obtained like the example 5 of a comparison except having used [a-8] instead of [the example 6 of a comparison] and [a-7] was 4.6×10^{11} ohms. This film was ground and the film which painted the antielectricity characteristic paint film like the example 12 was obtained except having used the chip-sized ingredient. The obtained film had the poor hue colored light yellow.

[0108]

[Table 2]

	制電性塗膜組成(重量%) *1			塗膜厚さ (μm)	フィルム特性	
	帯電防止剤	バインダー樹脂			表面固有抵抗 (Ω)	再生フィルム 着色性
実施例 12	a-6 (38%)	b-4 (9%)	b-5 (43%)	0.13	3.4×10^{11}	A
実施例 13	a-6 (38%)	b-4 (9%)	b-5 (43%)	0.19	3.4×10^{11}	A
実施例 14	a-6 (38%)	b-4 (9%)	b-5 (43%)	0.23	3.0×10^{11}	A
実施例 15	a-6 (55%)	b-4 (20%)	b-5 (15%)	0.16	3.1×10^{11}	A
実施例 16	a-6 (55%)	b-4 (20%)	b-5 (15%)	0.21	3.0×10^{11}	A
実施例 17	a-6 (55%)	b-4 (20%)	b-5 (15%)	0.26	2.6×10^{11}	A
実施例 18	a-6 (55%)	b-4 (20%)	b-5 (15%)	0.11	4.8×10^{11}	A
実施例 19	a-6 (40%)	b-4 (18%)	b-5 (32%)	0.12	4.1×10^{11}	A
比較例 4	—	—	—	—	8.2×10^{15}	A
比較例 5	a-7 (37%)	b-4 (21%)	b-5 (32%)	0.18	3.7×10^{12}	A
比較例 6	a-8 (37%)	b-4 (21%)	b-5 (32%)	0.18	4.6×10^{11}	C

*1 c-1: ポリオキシエチレンノニルフェニルエーテル (10重量%)

[0109] In the antielectricity characteristic paint film presentation of Table 2, the component [c-2] of an antistatic agent [a-6], [a-7], [a-8], binder resin [b-4], [b-5], and others is a copolymer, a following compound, or following mixture, respectively.

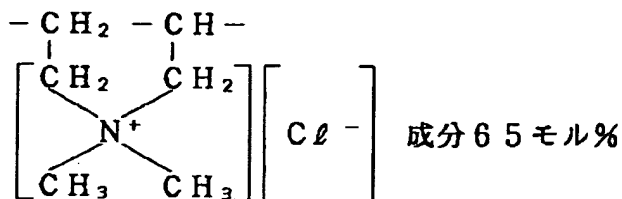
[0110] [a-6]: Eight mol % and said type (III-1) of 86 mol % and ethyl-acrylate components of ethylene components Six mol % ($-\text{CH}_2\text{CHCONH}(\text{CH}_2)_3\text{N}^+(\text{CH}_3)$) and $[\text{CH}_3\text{SO}_3^-]$ % of copolymer of components shown (average molecular weight: 5,500)

[a-7]: Two mol % of the copolymer of seven mol % and 2-hydroxyethyl acrylate components of 35 mol % and methyl-acrylate components of 56 mol % and sodium styrenesulfonate components of styrene components (average molecular weight: 26,800)

[0111]

[Formula 14]

[a-8] : アクリル酸エチル成分 35 モル% 及び



の共重合体 (平均分子量 : 8,700)

[0112] [b-4]: For a dicarboxylic acid component, a terephthalic acid (56-mol %) and isophthalic acid (44-mol %), and a glycol component are the copolymer (average molecular weight: 18,500) of ethylene glycol (72-mol %), a diethylene glycol (ten-mol %), neopentyl glycol (12-mol %), and a polyethylene glycol (six-mol %).

[b-5]: Six mol % of the copolymer of four mol % and N-methylol acrylamide components of 51 mol % and ethyl-acrylate components of methyl-methacrylate components (average molecular weight: 45,500) [of 39 mol % and acrylic-acid hydroxyethyl components]

[c-1]: Polyoxyethylene nonyl phenyl ether (the repeat number of unit of a polyoxyethylene = 9)

[0113] The polyethylene terephthalate of the intrinsic viscosity 0.63 which contains [example 21] titanium oxide 13% of the weight was fused, and the cast was carried out to cooling drum lifting, and it flowed into it, extended 3.4 times to the lengthwise direction in **, and considered as the uniaxial stretched film. On one side of this uniaxial stretched film, 84 mol % of ethylene components, Nine mol % and said type (III-3) of methyl-acrylate components 32 % of the weight (a-9: average molecular weight 5,870) of seven mol (-[CH₂ CHCONH(CH₂)₃ N+3 (CH₃)] and [CH₃ SO₃-]) % of copolymers of components shown, 42 mol % of 30 mol % and ethyl methacrylate components of methyl-methacrylate components, 11 mol % of three mol % and ethyl-acrylate components of methyl-acrylate components, Three mol % of five mol % and acrylic-acid 2of one mol % and glycidyl methacrylate components of acrylic-acid components-hydroxyethyl components, Two mol % of acrylamide components And three mol % of copolymer of N-methoxymethyl acrylamide components (b-6: A mean molecular weight 46,500, Tg=56 degree C) The 5-% of the weight aquosity liquid of the presentation which becomes a list from 10 % of the weight (c-2: mean molecular weight 4,050) of ethyleneoxide propylene oxide block copolymers 58% of the weight was applied by the gravure coating machine. Subsequently, it extended after desiccation at 104 degrees C, the spreading film was extended 3.9 times in the longitudinal direction at 108 degrees C, and the spreading film with a thickness of 195 micrometers which heat-treated at 222 degrees C and painted the antielectricity characteristic paint film was built. The antielectricity characteristic paint film thickness of this film was 0.12 micrometers, and light transmission was 0%. The property of a film is shown in Table 3. In addition, each of blocking resistance of this film and evaluation results of *****-proof was A.

[0114] The result of the paint film property of a film of having obtained the presentation of examples 22-30 and [example 7 of comparison] coating liquid and spreading thickness like the example 21 in Table 3 except having changed like a publication is shown in Table 3. Moreover, an evaluation result the blocking resistance of this film, *****-proof, ink adhesive, and heat-resistant is shown in Table 4.

[0115]

[Table 3]

	制電性塗膜組成(重量%)				塗膜厚さ (μm)	塗膜特性	
	帯電防止剤	バインダー樹脂		界面活性剤		表面エネルギー (dyne/cm)	水接触角 (度)
実施例21	a-9(320)	b-6(580)	—	c-2(100)	0.12	61	72
実施例22	a-9(320)	b-6(580)	—	c-2(100)	0.18	61	72
実施例23	a-9(320)	b-6(580)	—	c-2(100)	0.22	61	72
実施例24	a-9(370)	b-6(530)	—	c-3(100)	0.11	64	74
実施例25	a-9(370)	b-6(530)	—	c-3(100)	0.17	64	74
実施例26	a-9(430)	b-6(470)	—	c-3(100)	0.13	65	74
実施例27	a-9(430)	b-6(470)	—	c-4(100)	0.20	65	74
実施例28	a-10(320)	b-7(580)	—	c-3(100)	0.14	59	81
実施例29	a-10(300)	b-7(550)	b-8(550)	c-4(100)	0.19	32	72
実施例30	a-9(310)	b-6(310)	b-9(280)	c-4(100)	0.20	68	30
比較例7	—	b-6(900)	—	c-2(100)	0.13	52	63

[0116]

[Table 4]

	フイルム特性					
	飽和帯電圧 (KV)	インキ接着性	耐削れ性	耐熱性	耐ブロッキング性	
実施例21	0.2	A	A	A	A	A
実施例22	0.2	A	A	A	A	A
実施例23	0.1	A	A	A	A	A
実施例24	0.2	A	A	A	A	A
実施例25	0.1	A	A	A	A	A
実施例26	0.1	A	A	A	A	A
実施例27	0.1	A	A	A	A	A
実施例28	0.2	A	A	A	A	A
実施例29	0.7	A	B	B	B	B
実施例30	0.9	A	B	B	B	B
比較例7	3.5	C	A	A	A	A

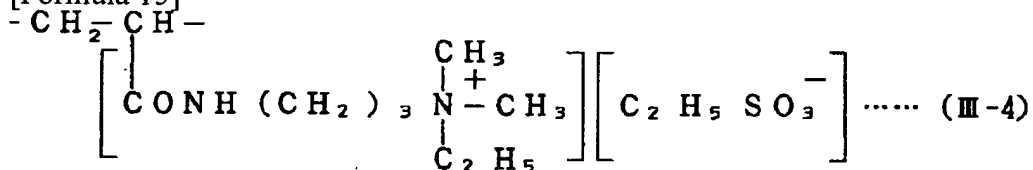
[0117] In the antielectricity characteristic paint film presentation of Table 3, an antistatic agent [a-9] and [a-10], binder resin [b-6], [b-7], [b-8] and [b-9], a surfactant [c-2], [c-3], and [c-4] are the following copolymers, respectively.

[0118] [a-9]: Nine mol % and said type (III-3) of 84 mol % and methyl-acrylate components of ethylene components Seven mol $(-\text{[CH}_2\text{CHCONH(CH}_2\text{)}_3\text{N}^+\text{(CH}_3\text{)]}$ and $[\text{CH}_3\text{SO}_3^-]$ % of copolymer of components shown (average molecular weight: 5,870)

[a-10]: The five mol % and following type of 89 mol % and ethyl-acrylate components of ethylene components (III-4) Six mol $([\text{CH}_2\text{CHCONH(CH}_2\text{)}_3\text{N}^+\text{(CH}_3\text{)C}_2\text{H}_5\text{]}$ and $[\text{C}_2\text{H}_5\text{SO}_3^-]$ % of copolymer of components shown (average molecular weight: 5,750)

[0119]

[Formula 15]



[0120] [b-6] Three mol % of the copolymer of two mol % and N-methoxymethyl acrylamide

components of three mol % and acrylamide components of five mol % and acrylic-acid 2 of one mol % and glycidyl methacrylate components of 11 mol % and acrylic-acid components of three mol % and ethyl-acrylate components of 42 mol % and methyl-acrylate components of 30 mol % and ethyl methacrylate components of methyl-methacrylate components-hydroxyethyl components (average molecular weight 46,500, Tg=56 degree C)

[b-7]: Three mol % of the copolymer of one mol % and N-methylol acrylamide components of three mol % and acrylamide components of five mol % and acrylic-acid-2 of one mol % and glycidyl methacrylate components of one mol % and acrylic-acid components of eight mol % and butyl acrylate components of 78 mol % and methyl-acrylate components of ethyl methacrylate components-hydroxyethyl components (average molecular weight : 29,600 Tg=66 degree C)

[b-8]: The block copolymer which made the copolymer [b-7] 32 weight section copolymerize the poly dimethylsiloxane (acid number 67) 68 weight section which has a hydroxyl group. (Average molecular weight: 44,500)

[b-9]: A dicarboxylic acid component is isophthalic acid (14-mol %), an adipic acid (five-mol %), and 5-K sulfoisophtharate (81-mol %), and a glycol component is the copolymer (average molecular weight: 14,200) of a diethylene glycol (93-mol %) and 1,4-butanediol (seven-mol %).

[c-2]: Ethyleneoxide propylene oxide block copolymer (average molecular weight: 4,050)

[c-3]: Ethyleneoxide propylene oxide block copolymer (average molecular weight: 6,560)

[c-4]: Ethyleneoxide propylene oxide block copolymer (average molecular weight: 4,710)

[0121] After painting the magnetic layer containing a magnetic oxide of iron on antielectricity characteristic paint film the non-painting side of the spreading film obtained in the [example 31] example 21 and painting a protective layer further, UV irradiation of the ultraviolet curing ink was offset and carried out to the opposite side (antielectricity characteristic paint film painting side), and it was made to harden it. Although this film was cut out and the card was produced, there was also no process top trouble and the handling nature of a card and the adhesion of a magnetic layer and an ink layer were also satisfactory practically.

[0122]

[Effect of the Invention] Since the antistatic agent of specific structure is used, it excels in the tooth-back imprint nature of an antistatic agent and a high antielectricity characteristic is acquired also by the comparatively thin antielectricity characteristic paint film, the antielectricity characteristic film of this invention is useful to a magnetic card, wrapping and a photograph ingredient, a graphic ingredient, a platemaking film, an OHP film, a magnetic-recording medium, etc.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

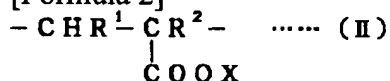
[Claim(s)]

[Claim 1] the configuration (unit i) 10-99 mol shown at least in one side of polyester film by the following formula (I) -- % -- The aqueous coating liquid containing the antistatic agent (A) which uses as a principal component the configuration unit (iii) 1 shown by the configuration unit (ii) 0 shown by the following formula (II) - the 80-mol % and following formula (III) - 40-mol % of a copolymer (A-1) is applied. The antielectricity characteristic film with which the antielectricity characteristic paint film extended [was dried and] and built is prepared.

[Formula 1]

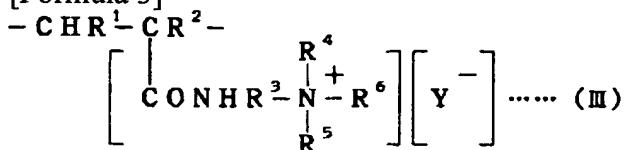


[Formula 2]



[-- the inside of a formula (II), R1, and R2 -- H or CH3 as for; X, the carbon number by which the saturated hydrocarbon radical of 1-10 or a part of H was permuted for H and a carbon number by the hydroxyl group, the alkoxy group, or the glycidyl group shows the saturated hydrocarbon radical of 1-10 --]

[Formula 3]



the inside of [type (III), R1, and R2 -- H or CH3; R3 -- a carbon number -- 2 - 10 alkylene-group; -- R4 -- R5 and R6 The saturated hydrocarbon radical of 1-15 or a part of H Hydroxyl group, [a carbon number] The carbon number permuted by the alkoxy group or the glycidyl group is saturated hydrocarbon radical; Y of 1-15. - Halogen ion,] which shows monochrome or the Pori alkyl halide ion, nitrate ion, sulfate ion, alkyl sulfate ion, sulfonate ion, or alkyl sulfonate ion

[Claim 2] the configuration (unit i) 50-96 mol a copolymer (A-1) is indicated to be by the above-mentioned formula (I) -- % -- They are the configuration unit (iii) 4 shown by the configuration unit (ii) 0 shown by the above-mentioned formula (II) - the 25-mol % and above formula (III) - 25-mol % of a copolymer. Y in a formula (III) - R7 SO3 - Antielectricity characteristic film according to claim 1 which is the alkyl sulfonate ion (a carbon number R7 [however,] saturated hydrocarbon radical of 1-5) shown.

[Claim 3] The antielectricity characteristic film according to claim 1 with which an antistatic agent (A) contains as a component the compound (A-3) which has the 4th class amine salt in the copolymer (A-2) or intramolecular which has a phosphate radical and/, or a sulfonate radical in a copolymer (A-1) list at

intramolecular.

[Claim 4] The antielectricity characteristic film according to claim 1 with which aqueous coating liquid contains at least one sort of binder (resin B) 0-95 % of the weight constituents chosen from the group which becomes (antistatic-agent A) 5-100 % of the weight from polyester resin (B-1), acrylic resin (B-2), and acrylic denaturation polyester resin (B-3).

[Claim 5] the configuration (unit i) 60-95 mol a copolymer (A-1) is indicated to be by the above-mentioned formula (I) -- % -- the configuration unit (ii) 0 shown by the above-mentioned formula (II) (the inside of a formula (II), R1, and R2 -- H or CH₃; X -- H or a carbon number -- the saturated hydrocarbon radical of 1-6) - the 25-mol % and above type (III) (however, among a formula (III)) [however,] R1 and R2 H or CH₃ ; R3 a carbon number -- alkylene group [of 2-10]; -- R4 -- R5 and R6 A carbon number is saturated hydrocarbon radical; Y of 1-5. - R7 SO₃ - Alkyl sulfonate ion shown, R7 It is 5-15 mol (iii) % of configuration units a carbon number is indicated to be by the saturated hydrocarbon radical of 1-5. It is acrylic resin whose acrylic resin (B-2) is 20-100 degrees C of second order transition points. An antielectricity characteristic paint film applies the aqueous coating liquid containing the constituent which becomes a list from (Surfactant C) 0-25 % of the weight an antistatic agent (A) 10 binder resin (B) 20 - 80% of the weight 80% of the weight. The antielectricity characteristic film according to claim 4 which it is dried, extended and built and surface energy uses for the magnetic card 37 - 73 dyne/cm and whose water contact angle are 40 - 110 degrees.

[Claim 6] The antielectricity characteristic film according to claim 1 whose polyester film is white polyester film for magnetic cards.

[Claim 7] The antielectricity characteristic film according to claim 1 whose polyester film is transparency polyester film.

[Claim 8] The antielectricity characteristic film according to claim 1 used for the magnetic card which carried out the laminating of the magnetic layer to one side of an antielectricity characteristic film which prepared the antielectricity characteristic paint film at least in one side of polyester film.

[Claim 9] The antielectricity characteristic film according to claim 8 which prepared the ultraviolet curing ink layer in the opposite field which carried out the laminating of the magnetic layer.

[Translation done.]